0064479

Shaw™
Shaw E & I, Inc.

RECEIVED
APR 18 2005
EDMC

Geotechnical Laboratory
PO Box 4339
1570 Bear Creek Road
Oak Ridge TN 37830
(865) 482-6497

CERTIFICATE OF ANALYSIS

Stephen Trent
Fluor Hanford, Inc.
825 Jadwin Avenue
Richland, Washington 99352

January 19, 2005

F03-018

This is the Certificate of Analysis for the following samples:

Shaw Project ID:	**Eberline - Hanford**
Shaw Project Number:	**100846.41000000**
Client Sample Data Group:	H28623 1/21/05 RE
Date Received by Lab:	December 6, 2004
Number of Samples:	Two (2)
Sample Type:	Soil

I. Introduction/Case Narrative

Two soil samples were received by the Shaw Geotechnical Laboratory on December 6, 2004. The samples were submitted for determination of moisture content, bulk density, sieve analysis, hydraulic conductivity, specific gravity, and calcium carbonate content. The sample numbers received were B19ND4 and B1BW61.

Please see Appendix A, Sample Number Cross Reference List; Appendix B, Analysis Results; and Appendix C, Chain-of-Custody/Sample Receipt Records.

"I certify that this data package is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature."

Reviewed and Approved:

Ralph Cole
Laboratory Manager, Geotechnical Services

RECEIVED
JAN 21 2005

Shaw Geotechnical Laboratory
Oak Ridge TN
(865) 482-6497

II. Analytical Results/Methodology

REFERENCES: United States Army Corps of Engineers (USACE), Engineer Manual 1110-2-1906, *Laboratory Soils Testing*, appendix II, 1970; United States Environmental Protection Agency, SW846, *Test Methods for Examining Solid Waste, Physical/Chemical Methods*, 3rd ed., Nov 1986 (EPA SW-846). Annual Book of ASTM Standards, Section 4, Construction, Volume 04.08, *Soil and Rock (I)*, and Volume 04.09, *Soil and Rock (II)*, 2004. Shaw Environmental and infrastructure, Standard Operating Procedures.

Moisture Content of Soil and Rock	**ASTM D 2216**
Bulk Density of Soils	**EM 1110-2-1906**
Particle-size Analysis of Soils	**ASTM D 422**
Hydraulic Conductivity of Porous Materials Using a Flexible Wall Permeameter	**ASTM D 5084**
Specific Gravity of Soil	**ASTM D 854**
Calcium Carbonate Content	**ASTM D 4373**

III. Quality Control

Quality control checks such as duplicates and spikes (QC samples), are not normally applicable to geotechnical testing. This is due largely to the inability of obtaining samples with known characteristics, the heterogenous nature of the samples, and quality control procedures built-in to the analytical method.

QC measures to ensure accuracy and precision of test results include the following:

- 100% verification of all numerical results - raw data entries, transcriptions and calculations entered by lab technicians are checked, recalculated and verified. Most data calculations are performed by computer programs.

- Data validation through test reasonableness - summaries of all test results for individual reports are reviewed to determine the overall reasonableness of data and to determine the presence of any data that may be considered outliers.

- Quality control procedures are built into most standardized geotechnical procedures. For example, liquid limit and plastic limit analyses call for re-analyses and specify acceptance criteria.

- Routine instrument calibration - instruments, gauges and equipment used in testing are calibrated on a routine basis. All instrument calibration follows ASTM or manufacturer guidelines.

Shaw Geotechnical Laboratory
Oak Ridge TN
(865) 482-6497

- Maintenance of all past calibration records - calibration records and certification documents of all instruments, gauges and equipment are updated routinely and maintained in the Quality Control Coordinators Quality/Operations files.

- Certified and trained personnel - all technicians are certified by the National Institute for Certification of Engineering Technicians (NICET) in geotechnical soil testing, and are trained in the application of standard laboratory procedures for geotechnical analyses as well as the quality assurance measures implemented by Shaw.

- Quantitative analyses frequently used in geotechnical/physical testing programs do not use QC tools common to wet chemistry or radiochemistry laboratories. Measures not employed in the analysis of samples reported in this report include: laboratory control samples (LCS), blanks, matrix spikes (MS), duplicate analyses, dilutions, digestions, correction factors, surrogate sample analyses, detection limit determinations, control charts, and/or tentatively identified compounds (TICs).

IV. Data Qualification

None.

Appendix A
Sample Cross-Reference List

January 19, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.41000000
SDG No. H2863

Shaw Geotechnical Laboratory
Oak Ridge TN
(865) 482-6497

SAMPLE NUMBER CROSS-REFERENCE LIST

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MATRIX
BC0492	B19ND4	Soil
BC0493	B1BW61	Soil

Appendix B
Sample Test Results

January 19, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.41000000
SDG No. H2863

Shaw Geotechnical Laboratory
Oak Ridge TN
(865) 482-6497

MOISTURE CONTENT

PROJECT NAME
Eberline - Hanford

PROJECT NUMBER
100846.41000000

LAB SAMPLE NO.	CLIENT SAMPLE NO.	MOISTURE, % ASTM D 2216	MOISTURE , % SW846	SOLIDS, % SW846
BC0492	B19ND4	27.7	21.7	78.3
BC0493	B1BW61	30.3	23.3	76.7

ASTM D 2216 results are based on dry sample weight.
SW846 results are based on wet sample weight.
Solids content is determined by subtracting the SW846 moisture (%) from 100.

Shaw Geotechnical Laboratory
Oak Ridge TN
(865) 482-6497

BULK DENSITY/DRY DENSITY
EM-1110-2-1906, APPENDIX II

PROJECT NAME: **Eberline - Hanford**

PROJECT NUMBER: **100846.41000000**

LAB SAMPLE NUMBER	CLIENT SAMPLE NUMBER	AVERAGE LENGTH, inches	AVERAGE DIAMETER, inches	WET WEIGHT, grams	MOISTURE CONTENT, %	BULK DENSITY, pcf	DRY DENSITY, pcf
BC0492	B19ND4	5.4365	3.8747	1838.59	35.5	109.3	80.7
BC0493	B1BW61	4.1518	3.8472	1530.4	29.8	120.8	93.1

Moisture content calculated by ASTM D 2216 based on sample dry weight.

Bulk density is the weight of wet sample divided by the volume of the wet sample (as-received).

Dry density is the weight of the dry sample solids divided by the volume of the original sample.

January 19, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.41000000
SDG No. H2863

Shaw Geotechnical Laboratory
Oak Ridge TN
(865) 482-6497

PARTICLE-SIZE DISTRIBUTION
ASTM D 422

Project Name Eberline Hanford

Project No. 100846.41000000

Field Sample No. B19ND4

Lab Sample No. BC0492

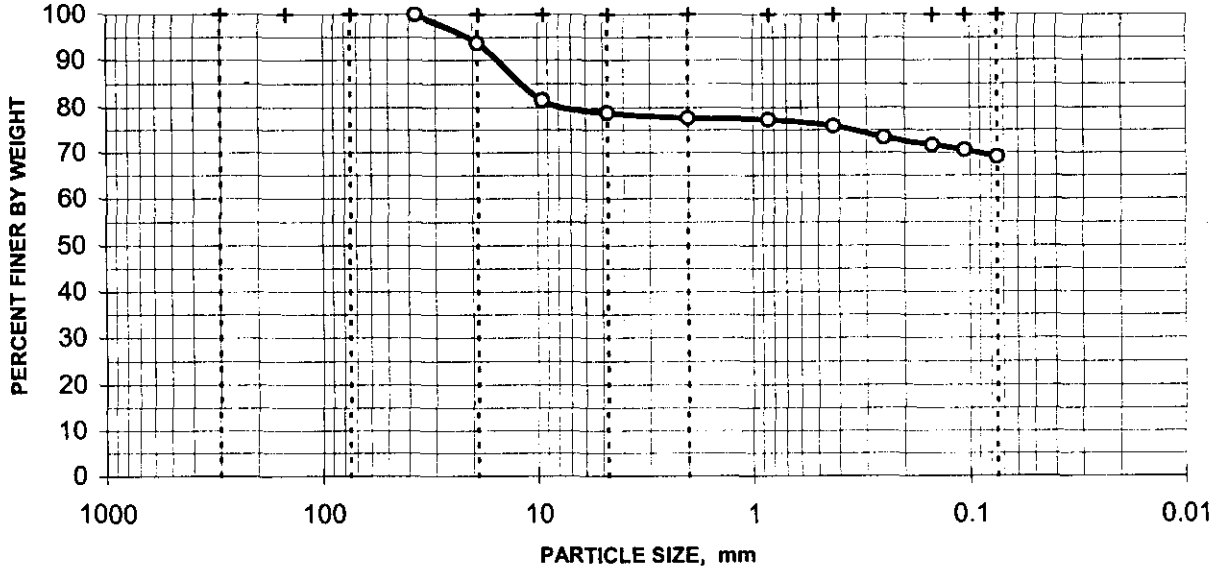
Moisture Content = 35.5%
based on dry sample weight

SIEVE ANALYSIS

	Sieve No.	Diameter mm	Percent Finer
COARSE	3"	75.000	100.0%
	1.5"	37.500	100.0%
	0.75"	19.000	93.7%
	0.375"	9.500	81.5%
	#4	4.750	78.8%
	#10	2.000	77.6%

	Sieve No.	Diameter mm	Percent Finer
FINE	#20	0.850	77.3%
	#40	0.425	75.9%
	#60	0.250	73.3%
	#100	0.149	71.6%
	#140	0.106	70.6%
	#200	0.075	69.1%

DISTRIBUTION CURVE



21.2% Gravel 9.7% Sand 69.1% Silt/Clay

January 19, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.41000000
SDG No. H2863

Shaw Geotechnical Laboratory
Oak Ridge TN
(865) 482-6497

PARTICLE-SIZE DISTRIBUTION
ASTM D 422

Project Name Eberline Hanford

Project No. 100846.41000000

Field Sample No. B1BW61

Lab Sample No. BC0493

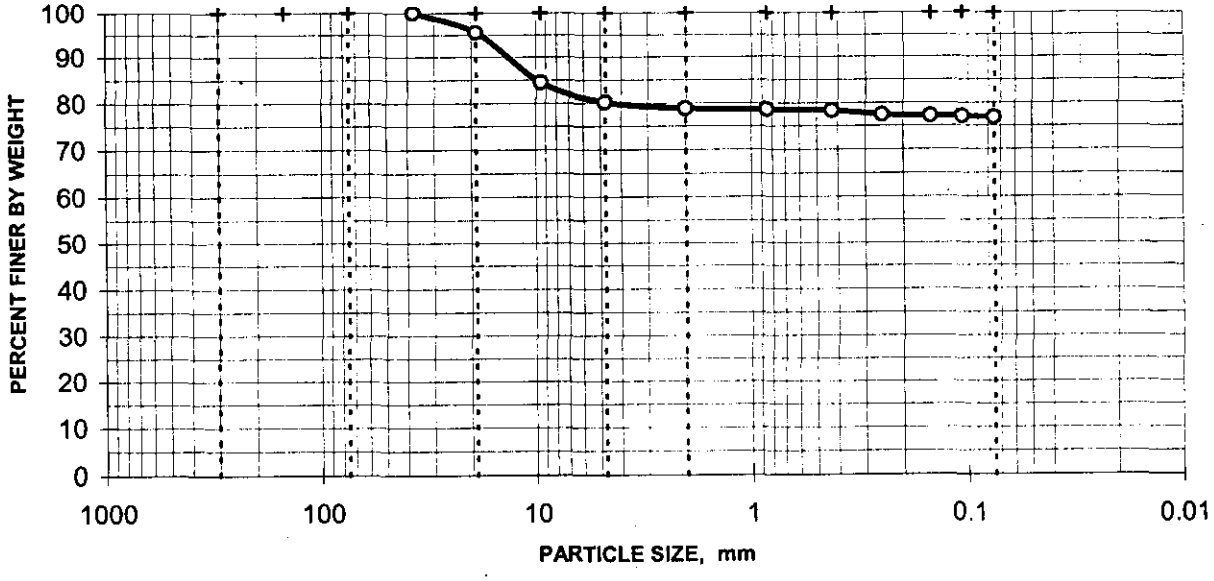
Moisture Content = 29.8%
based on dry sample weight

SIEVE ANALYSIS

	Sieve No.	Diameter mm	Percent Finer
COARSE	3"	75.000	100.0%
	1.5"	37.500	100.0%
	0.75"	19.000	95.5%
	0.375"	9.500	84.5%
	#4	4.750	80.2%
	#10	2.000	78.8%

	Sieve No.	Diameter mm	Percent Finer
FINE	#20	0.850	78.6%
	#40	0.425	78.3%
	#60	0.250	77.4%
	#100	0.149	77.1%
	#140	0.106	77.0%
	#200	0.075	76.8%

DISTRIBUTION CURVE



19.8% Gravel 3.3% Sand 76.8% Silt/Clay

00000010

January 19, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.41000000
SDG No. H2863

Shaw Geotechnical Laboratory
Oak Ridge TN
(865) 482-6497

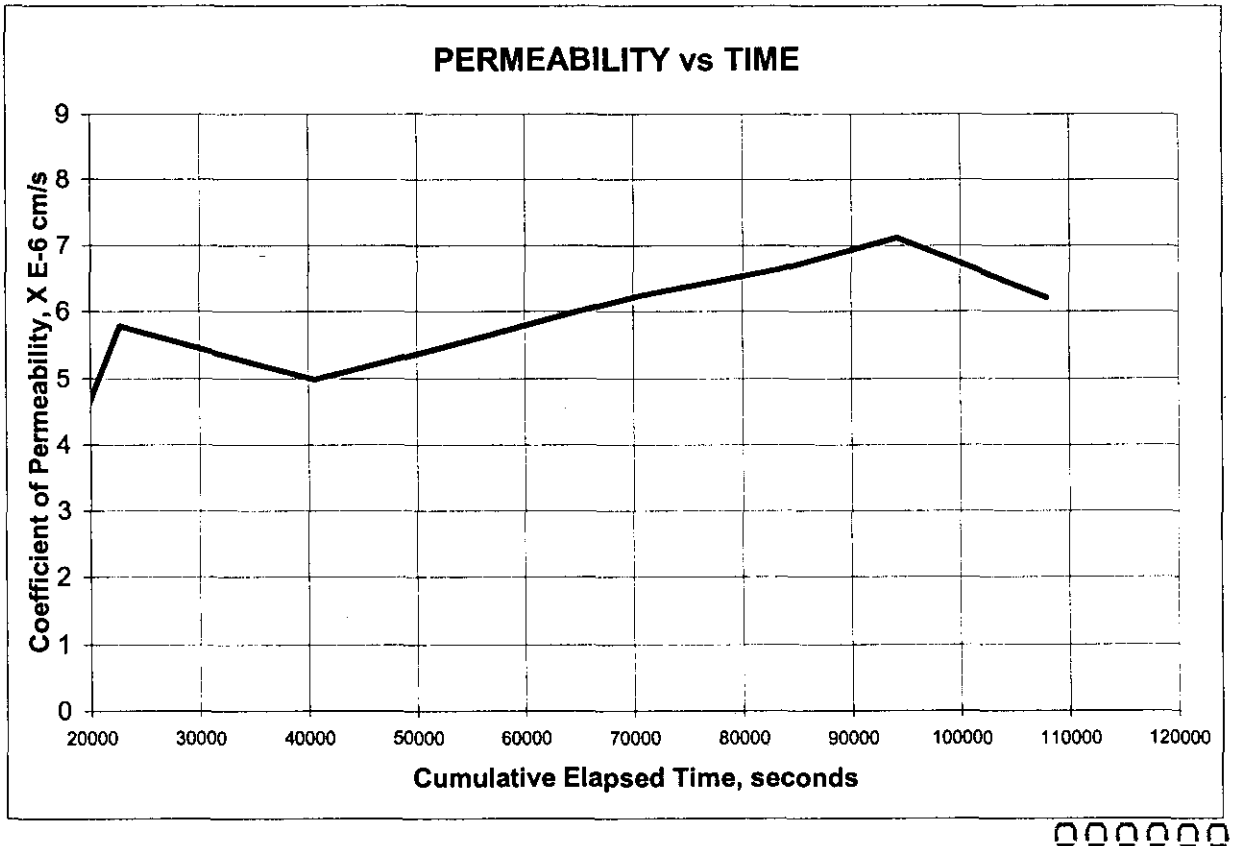
HYDRAULIC CONDUCTIVITY / PERMEABILITY
ASTM D 5084

PROJECT NAME:	Eberline Hanford	CLIENT SAMPLE NO.	B19ND4
PROJECT NO.	100846.41000000	LAB SAMPLE NO.	BC0492

	INITIAL	FINAL
Specimen diameter, cm	6.36	
Specimen length, cm	10.07	
Wet weight of specimen, g.	553.34	
Specimen cross-sect. area, cm^2	31.76	
Water content, %	35.5	
Wet unit weight, pcf	108.0	
Dry unit weight, pcf	79.7	
Degree of saturation, %	84.2	
Specific gravity of solids	2.76	

Hydraulic gradient	7.0
Min. consolidation stress, psi	10.0
Max. consolidation stress, psi	10.0
Total backpressure, psi	0.0
Permeant Fluid	Deaired DI Water

Coefficient of Permeability, cm/s 6.5E-06



January 19, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.41000000
SDG No. H2863

Shaw Geotechnical Laboratory
Oak Ridge TN
(865) 482-6497

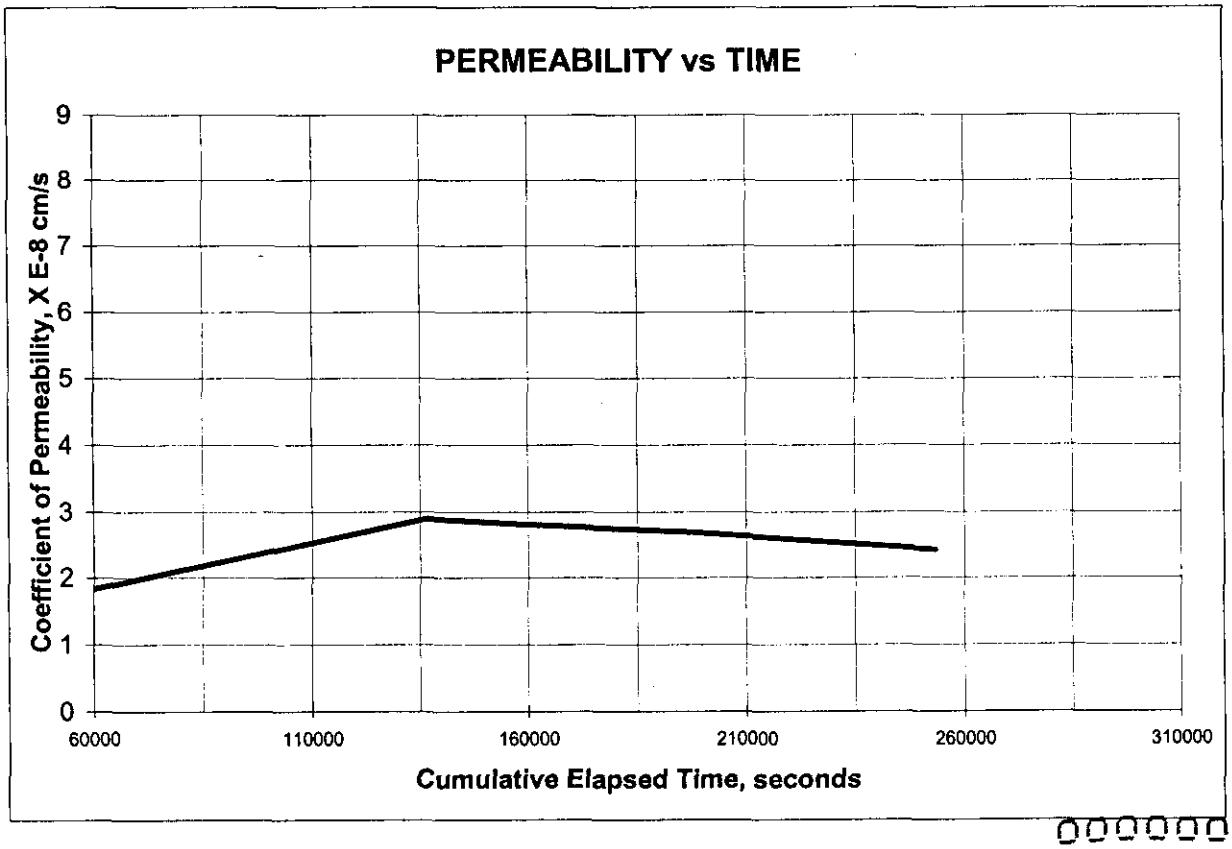
HYDRAULIC CONDUCTIVITY / PERMEABILITY
ASTM D 5084

PROJECT NAME:	Eberline Hanford	CLIENT SAMPLE NO.	B1BW61
PROJECT NO.	100846.41000000	LAB SAMPLE NO.	BC0493

	INITIAL	FINAL
Specimen diameter, cm	7.38	
Specimen length, cm	9.88	
Wet weight of specimen, g.	811.7	
Specimen cross-sect. area, cm^2	42.77	
Water content, %	29.8	
Wet unit weight, pcf	120.0	
Dry unit weight, pcf	92.5	
Degree of saturation, %	97.0	
Specific gravity of solids	2.72	

Hydraulic gradient	28.5
Min. consolidation stress, psi	5.0
Max. consolidation stress, psi	5.5
Total backpressure, psi	7.5
Permeant Fluid	Deaired DI Water

Coefficient of Permeability, cm/s 2.7E-08



January 19, 2005
Stephen Trent
Fluor Hanford, Inc.
Shaw Project Name: Eberline Hanford
Shaw Project No. 100846.41000000
SDG No. H2863

Shaw Geotechnical Laboratory
Oak Ridge TN
(865) 482-6497

SPECIFIC GRAVITY
ASTM C 127 ASTM D 854

PROJECT NAME: Eberline Hanford **PROJECT NUMBER:** 100846.41000000

LAB SAMPLE NUMBER	CLIENT SAMPLE NUMBER	SPEC. GRAV. <4.75mm	BULK SPEC. GRAVITY	AVERAGE BULK SPEC. GRAVITY	APPARENT SPECIFIC GRAVITY	AVERAGE APPARENT SPEC. GRAV.	BULK SPEC. GRAVITY SSD*	ABSORPTION %
BC0492	B19ND4	2.7636	2.6145	2.7306	2.6746	2.7442	2.6370	0.86
BC0493	B1BW61	2.7168	2.6312	2.6994	2.6684	2.7071	2.6451	0.53

* Saturated Surface Dry

Shaw Geotechnical Laboratory
Oak Ridge TN
(865) 482-6497

Carbonate Content of Soils ASTM D 4373

PROJECT NAME: **Eberline Hanford**

PROJECT NUMBER: **100846.41000000**

LAB SAMPLE NO.	CLIENT SAMPLE NO.	CO3, %
BC0492	B19ND4	0
BC0493	B1BW61	0

Appendix C
Chain-of-Custody and Request-for-Analysis Records

FLUOR Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-018-147	PAGE 1 OF 1

COLLECTOR	COMPANY CONTACT	TELEPHONE NO.	PROJECT COORDINATOR	PRICE CODE 8N	DATA TURNAROUND
Pope/Pfister/Wiberg/Tyra	Steve Trent	373-5869	TRENT, SJ	AIR QUALITY ☐	45 Days / 45 Days
SAMPLING LOCATION 419.5 - 421' 216-Z-9/C3426 - Interval ~~417FT - 419.5FT~~	**PROJECT DESIGNATION** 216-Z-9 Trench Characterization Borehole - Soil		**SAF NO.** F03-018		
ICE CHEST NO. GRP-03.017 DT 11/30/04	**FIELD LOGBOOK NO.** HNF-N-360 1	**COA** 11932SES10	**METHOD OF SHIPMENT** Federal Express		
SHIPPED TO Shaw Group	**OFFSITE PROPERTY NO.** See PTR 14504		**BILL OF LADING/AIR BILL NO.** See PTR 14504		

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS	PRESERVATION	None	None
A=Air, DL=Drum Liquids, DS=Drum Solids, L=Liquid, O=Oil, S=Soil, SE=Sediment, T=Tissue, V=Vegitation, W=Water, WI=Wipe, X=Other	RADIOACTIVE TIE TO: ~~B19LK8~~ MHP B19LK7 12/1/04 SDG# H2863	TYPE OF CONTAINER	Moisture Resistant Cont	Liner
		NO. OF CONTAINER(S)	1	2
		VOLUME	200g	1000g
	SPECIAL HANDLING AND/OR STORAGE	SAMPLE ANALYSIS	Moisture Content - D2216;	SEE ITEM (1) IN SPECIAL INSTRUCTIONS #1 - 3209g #2 - 2474 g

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME										
B19ND4	SOIL	11/30/04	1000	X	X								
BC 0492													

CHAIN OF POSSESSION	SIGN/ PRINT NAMES	SPECIAL INSTRUCTIONS
RELINQUISHED BY/REMOVED FROM: JS Pope/M Pfister 11-30-04 DATE/TIME 1445	RECEIVED BY/STORED IN: MSC-026 Ref. #1 11:30 04 DATE/TIME 1445	(1)Bulk Density - D2937; Particle Size (Dry Sieve) - D422; Saturated Hydraulic Conductivity; Particle Density - D854; Calcium Carbonate Content;
RELINQUISHED BY/REMOVED FROM: MSC-026, KRJ 12/1/04 0820 DATE/TIME	RECEIVED BY/STORED IN: M.H. Barnes/W.T.G. Barnes 12/1/04 0820 DATE/TIME	
RELINQUISHED BY/REMOVED FROM: M.H. Barnes/W.T.G. Barnes 12/1/04 0820 DATE/TIME	RECEIVED BY/STORED IN: FED EX DATE/TIME	
RELINQUISHED BY/REMOVED FROM: Fed Ex 12/2/04 9:00 DATE/TIME	RECEIVED BY/STORED IN: Fed Ex 12/2/04 16:30 DATE/TIME	To SHAW
RELINQUISHED BY/REMOVED FROM: Fed Ex 12/2/04 9:00 DATE/TIME	RECEIVED BY/STORED IN: Fed Ex DATE/TIME	
RELINQUISHED BY/REMOVED FROM DATE/TIME	RECEIVED BY/STORED IN DATE/TIME	
RELINQUISHED BY/REMOVED FROM DATE/TIME	RECEIVED BY/STORED IN DATE/TIME	

LABORATORY SECTION	RECEIVED BY	TITLE	DATE/TIME
	SHAW	12/6/04 @1000	
FINAL SAMPLE DISPOSITION	**DISPOSAL METHOD**	**DISPOSED BY**	**DATE/TIME**

A-6003-618(03/03)

Fluor Hanford Inc.	CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST	F03-018-183	PAGE 1 OF 1

COLLECTOR Pope/Pfister/Wiberg/Tyra	COMPANY CONTACT Steve Trent	TELEPHONE NO. 373-5869	PROJECT COORDINATOR TRENT, SJ
SAMPLING LOCATION 417.' - 419.5' 216-Z-9/C3426 - Interval ~~432FT - 434.5FT~~	PROJECT DESIGNATION 216-Z-9 Trench Characterization Borehole - Soil		SAF NO. F03-018
ICE CHEST NO. GRP-03-017 DT 11/30/04	FIELD LOGBOOK NO. HNF-N-360 1	COA 119325ES10	METHOD OF SHIPMENT Federal Express
SHIPPED TO Shaw Group	OFFSITE PROPERTY NO. See PTR 14504		BILL OF LADING/AIR BILL NO. See PTR 14504

PRICE CODE 8N | AIR QUALITY ☐ | DATA TURNAROUND 45 Days / 45 Days

MATRIX*	POSSIBLE SAMPLE HAZARDS/ REMARKS			
A=Air DL=Drum Liquids DS=Drum Solids L=Liquid O=Oil S=Soil SE=Sediment T=Tissue V=Vegitation W=Water WI=Wipe X=Other	RADIOACTIVE TIE TO: ~~B19LK9~~ MAB 12/1/04 B19LK7 SDG# H2863 SPECIAL HANDLING AND/OR STORAGE			

PRESERVATION	None	None
TYPE OF CONTAINER	Moisture Resistant Cont	Liner
NO. OF CONTAINER(S)	1	2
VOLUME	200g	1000g
SAMPLE ANALYSIS	Moisture Content - D2216;	SEE ITEM (1) IN SPECIAL INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME										
B1BW61	SOIL	11/30/04	0840	X	X								

BC 0493

CHAIN OF POSSESSION	SIGN/ PRINT NAMES		
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
MR WEIL / MR Weil	11/30/04 1445	MO026 FRIDGE #1	11/30/04 1445
MO-026 KR7	12/1/04 0920	M.H. Baechler / M.H. Baechler	12/1/04 0920
M.H. Baechler / M.H. Baechler	12/1/04 0920	Fed Ex	
Fed Ex	12/2/04 9:40	[illegible signature]	12/2/04 10:30
[illegible signature]	12/2/04 4:00	Fed Ex	

SPECIAL INSTRUCTIONS

(1)Bulk Density - D2937; Particle Size (Dry Sieve) - D422; Saturated Hydraulic Conductivity; Particle Density - D854; Calcium Carbonate Content;

LABORATORY SECTION	RECEIVED BY [signature]	TITLE SHAW	DATE/TIME 12/6/04 @ 1000
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD	DISPOSED BY	DATE/TIME

A-6003-618(03/03)

0000017

SDG# H2863

PAGE 1 Eberline Srvces CHAIN OF CUSTODY ORD # R4-12-017

12/02/04 14:52:52 WORK ID: SAF# F03-018 SDG H2863

RCVD: 12/02/04 DUE: 01/16/05 KEEP: 01/16/06 DISP: S

DASH	SAMPLE IDENTIFICATION	STORED	TESTS
01A-S	B19ND4	SHAW	DISPOS E329S E331S E333S E335S E342S
02A-S	B1BW61	SHAW	DISPOS E329S E331S E333S E335S E342S

RELEASED BY	DATE	TRANSFERRED TO	DATE	RECEIVED BY	DATE
[signature]	12/2/04	SHAW LAB	12/2/04	[signature]	12/6/04

00000018